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NAVAL WAR COLLEGE
Newport, R.I.

SELF-SYNCHRONIZATION ¾ THE NEXT STEP

By

Matthew A. Kosnar
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A paper submitted to the Faculty of the Naval War College in partial satisfaction of the requirements of the Department of Joint Military Operations.

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ABSTRACT

Self-synchronization is one of the most controversial and least developed theoretical aspects of Network Centric Warfare (NCW). It has been hailed as "perhaps the ultimate in achieving increased tempo and responsiveness," yet the impact of self-synchronization on waging war has brought as many critics as supporters. Self-synchronization is part of the NCW "revolution" which has been described as "a revolution in military affairs (RMA) unlike any seen since the Napoleonic Age." But where is NCW going to take the U.S. military and how are we going to get there?

Large organizations advance in steps and do not completely abandon proven methods for success. The same is true for the U.S. military and NCW. So if we are to extract battlefield advantages from NCW, a better question is: "What is the next step?" And in particular for this paper: "What steps will be necessary to allow self-synchronization?"

By examining new and classical elements of warfighting *with self-synchronization as a goal*, some ideas emerge as to what steps may be necessary to guide the development of the human-centric aspect of NCW within the U.S. military to create self-synchronization. This paper argues that by implementing fundamental, yet realistic, changes to basic operational art ideas: Culture, Doctrine, and Command and Control, the U.S. military will take the next step towards self-synchronization and significantly improved combat speed in future wars.

Introduction

Self-synchronization is one of the most controversial and least developed theoretical aspects of Network Centric Warfare (NCW). It has been hailed as "perhaps the ultimate in achieving increased tempo and responsiveness,"[1] yet the impact of self-synchronization on waging war is has brought as many critics as supporters. Self-synchronization is part of the NCW "revolution" which has been described as "a revolution in military affairs (RMA) unlike any seen since the Napoleonic Age."[2] But where is NCW going to take the U.S. military and how are we going to get there?

Is NCW truly a revolution or is it simply an evolution for the military? One recent study has declared this as the key question — the military must decide whether to embrace revolutionary change, or simply continue to improve on the principles and concepts of war that have lasted the "test of time."[3] In reality, however, large organizations do not completely abandon proven methods for success — they advance in measured and planned steps. The same is true for the U.S. military and NCW. So if we are to extract battlefield advantages from NCW, a better question is: "What is the next step?" And in particular for this paper: "What steps will be necessary to allow self-synchronization?" Before this can be addressed, it is important to present some common principles of NCW that are essential to self-synchronization.

NCW is a loosely defined concept. Upon investigation, you will find a range of definition — everything from broad and specific to no definition at all. This wide range of

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[1] David Alberts, John Garstka, and Frederick Stein, Network Centric Warfare 2nd ed. (Washington DC: U.D. Department of Defense, C4ISR Cooperative Research Program, 1999), 175.
[2] Arthur Cebrowski and John Garstka, "Network-Centric Warfare--Its Origin and Future," U.S. Naval Institute Proceedings (January 1998), 29.
[3] Erik Dahl, "Network Centric Warfare and the Death of Operational Art." (NWC 1012, U.S. Naval War College, n.d.), 1.

definitions is a natural consequence of NCW because it is a concept still being developed. It is deeply rooted in the world's technology revolution and it is still changing. The Navy's Capstone concept defined the Navy's application of NCW to warfare, Network Centric Operations (NCO), as:

> Network Centric Operations can be broadly described as deriving power from the rapid and robust networking of well-informed, geographically dispersed warfighters. They create overpowering tempo and a precise, agile style of maneuver warfare. Using effect-based operations, the aim is to sustain access and to decisively impact events ashore. Network Centric Operations focus on operational and tactical warfare, but they impact all levels of military activity from the tactical to the strategic. It is the emerging theory of war for the information age.[4]

The definition of NCO above identifies several important NCW concepts that give rise to self-synchronization: networked and well-informed warfighters, overpowering tempo, agile style of maneuver warfare, and focus on operational and tactical warfare.[5] This definition, however, emphasizes the technology aspect of NCW and does not give much guidance to the human-centric aspects of the NCW "revolution" — culture, organization, and doctrine. Analogies from business culture also emphasize technology. Admiral Cebrowski uses an example from General Electric's chief executive officer to explain self-synchronization in retailing: "When Wal-Mart sells a [light] bulb on the register, it goes to my factory instantly — I (General Electric) make the bulb for the one they just sold."[6] This comparison gives NCW a cold and technology-centric focus, yet NCW for the military will inherently include more human-centric aspects. In fact, while the technology aspect of the NCW transformation has been well studied, the human-centric aspect has only begun to be investigated. A transformation will require changes in both.

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[4] U.S. Naval War College, "Network-Centric Operations: A Capstone Concept for Naval Operations in the Information Age." (NWC 1078, 2000), 1.
[5] Ibid.
[6] Arthur Cebrowski and John Garstka, 30.

One difficulty in trying to pin down steps to create self-synchronization is its complicated relationship to the military levels of war--strategic, operational, and tactical.[7] In fact, some studies have argued that severe changes in the levels of war must take place in order to foster the NCW culture.[8] Self-synchronization mostly interacts in the tactical level of war--which has previously been left to the tactical commander. But NCW has allowed us to have many more decision-makers that are networked and dispersed and this changes the character of the tactical level of war. Additionally, self-synchronization changes the classical relationship between the levels of war. These observations have caused split opinions on the proper function of the operational level of war, even whether to keep it at all.

Why go to all the trouble? Because self-synchronization can be an incredible advantage. "Network-centric warfare allows our forces to develop speed of command." It "enables forces to organize from the bottom-up--or to self-synchronize--to meet the commander's intent."[9] It can cause a jump compared to top-down command because "bottom-up organization yields self- synchronization,…and combat moves to a high-speed continuum."[10]

Thesis

By examining new and classical elements of warfighting *with self-synchronization as a goal*, some ideas emerge as to what steps may be necessary to guide the development of the human-centric aspect of NCW within the U.S. military to create self-synchronization. This paper argues that by implementing fundamental, yet realistic, changes to basic operational art

[7] U.S. Naval War College, "Network-Centric Operations: A Capstone Concept for Naval Operations in the Information Age." (NWC 1078, U.S. Naval War College, 2000), 1.
[8] Julius Washington, "Network Centric Warfare and Command & Control: Rethinking Organizational Architecture," (JMO Research Paper, U.S. Naval War College, 2001), 15.
[9] Arthur Cebrowski and John Garstka, 32.

[10] Arthur Cebrowski and John Garstka, 33.

ideas: Culture, Doctrine, and Command and Control, the U.S. military will take the next step towards self-synchronization and significantly improved combat speed in future wars.

Culture

Since Korea in 1953, the United States has been involved in many regional, asymmetric conflicts. These "wars" have been against minor military powers--or governments without an organized military at all. The only large force the United States has battled with has been the Iraqi Army in the Gulf War in 1991. The Iraqi Army was a large and seemingly professional force that Desert Storm planners took very seriously. Yet, when the ground war started, Saddam's forces proved significantly inferior to the coalition forces headed up by the United States. The Iraqi military machine easily folded under our devastating fire--much easier than expected even by the most optimistic planners.[11]

With overwhelming force and a long string of victories (Vietnam excluded), the U.S. is used to winning wars. This history also illustrates the recent focusing of U.S. military forces toward fighting and perfecting small limited wars, including the Terror War now in progress in Afghanistan. But resting on laurels and focusing only on limited, asymmetric small wars is dangerous.

Britain was in a position of fighting, and winning, limited wars from the fall of Napoleon until WWI. It fought small wars around the globe for 100 years and throughout Queen Victoria's reign. Yet, the British army found itself unprepared for WWI in 1914. Again in 1939, Britain was unprepared for Hitler's *Blitzkrieg* tactics. Although Britain had invented the tank near the end of WWI, it was Germany who used that new technology to an incredible advantage in speed that was devastating and decisive in the early years of WWII.

[11] Michael Gordon and Bernard Trainor, The General's War, (New York: Little, Brown and Company 1995), xiii.

It is smart to focus on small wars because we are fighting them today, but the U.S. military must also prepare for large-scale war with an equal enemy. One of the best concepts to advance for transformation is self-synchronization. Like Hitler's *Blitzkrieg*, it has the potential to give the tactical and operational levels of war an exponential speed boost. This increased speed could become a devastating battlefield advantage in future wars, and essential against a peer military competitor. Self-synchronization will also yield benefits in small wars, but is not required for victory.

The U.S. Navy has an independent operating culture firmly rooted in platform-centric warfare — independent command at sea.[12] The previous pace of war (before the 1950s) has allowed time for a ship's commanding officer to be part of the decision to commence firing, but even today's weapons make this type of command too slow. Shorter times from initial detection to impact of missiles in littoral operating environments will continue to increase the vulnerability of ship's unless self-synchronization can help pick up the pace. The Navy culture of independent command has been important to give ship commanders the most flexibility, but this philosophy must now be extended down another level to designated shooters. The U.S.S. Stark (hit by an Exocet missile) and U.S.S. Vincennes (shot down commercial airliner) incidents show how a culture of "call the Captain" is no longer combat effective — and outright dangerous in some cases.

Battlespace awareness

"Achieving high levels of battlespace awareness and knowledge lies at the foundation" of NCW and is critical for self-synchronization. The goal is to provide all networked warfighters with "chessboard" view of the battlespace. This ongoing effort is

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[12] Carl Builder, The Masks of War, (Baltimore, MD: John Hopkins University Press 1989), 18.

called *battlespace awareness* or *common operating picture (COP).*[13] The U.S. Navy has developed many battlespace awareness systems connected through various information nets and included many new battlespace awareness initiatives tested during Fleet Battle Experiment-India.[14] The goal is to give all warfighters Napoleon's hilltop view of the battlespace, including geography, terrain, weather, and all friendly and enemy positions.

There are inherent theoretical limitations as to what degree technology alone can provide perfect battlespace awareness. Although *friendly* positions and capabilities can approach "picture perfect" accuracy (due to advances in communications, remote sensing, and GPS), *enemy* positions and capabilities will always be harder to pinpoint. Clausewitz's "fog of war" rings as true today with NCW as it did for Napoleon. The ability to accurately sort out numerous and possibly conflicting reports of enemy action from a combination of troops, aircraft, ships, submarines, radars, satellites, UAVs, etc. is a skill that is still in infancy-but technology is improving. Enemy intentions remain a human-centric aspect of the "chessboard" that must be addressed with respect to self-synchronization. The better the "chessboard," the better the decisions by distributed warfighters and the better the advantage. How do we make the chessboard better?

The technology improvements needed to bring about better battlespace awareness to the military to improve self-synchronization have development parallels in commercial R&D (GPS, communications, small handheld computers and displays, etc). This commercial technology has been essential to keep the U.S. a world leader in military technology.

But joint expert battlespace awareness and COP will take more than technology. Developing and maintaining a joint, common, real-time picture will be complicated and

[13] David Alberts, John Garstka, and Federick Stein, 133.
[14] U.S. Naval War College, "Fleet Battle Experiment-India," (NWC 2004, 2001), 21-35.

require a healthy amount of human thinking and interpretation. Joint battlespace awareness warrants its own field of expertise. It is an advance as important and difficult as the shift from sail to steam on warships, in which new rates of expertise were required to transform the new technology for warfare. The military should create a professional joint rate for battlespace awareness expertise.

Doctrine

Doctrine is a link between culture and change. Any transformation will get its start in doctrine. Many elements of current U.S. joint doctrine already require the basics that self-synchronization will improve. "Operational art…focuses…synchronization and integration of air, land, sea, space, and special operations forces."[15] But, self-synchronization takes this one step further. It forces operational commanders to set the conditions for tactical commanders to be in automatic while being monitored at the operational level. This real time monitoring is essential in for the operational commander to insert corrections if the need arises.

"Offensive action is the most effective and decisive way to attain a clearly defined objective. Offensive operations are the means by which a military force seizes and holds the initiative while maintaining freedom of action and achieving decisive results."[16] Here, self-synchronization will become an offensive booster as speed of the initiative is increased to a decisive amount.

Thus, self-synchronization places another responsibility upon operational commanders — to build an environment where self-synchronization can take place — to foster a command culture where and forces are given a commander's intent and empowered

[15] Joint Chiefs of Staff, Joint Warfare of the Armed Forces of the United States, Joint Pub 1 (Washington, DC: 2000), II-3.

to take action using common battlespace awareness. Operational commanders should monitor and orchestrate their forces real-time, not direct their actions. This is the right step for the military to take, and it should be reflected in joint and service doctrine.

Command and Control and Levels of War

Two opposing command and control philosophies have emerged as best to incorporate NCW. One structure is centralized and top-down, where the "greater experience and knowledge will reside at higher command echelons [and] would seem to argue for centralizing decision making and control to the fullest extent allowed by communications capacity."[17] The opposing structure is decentralized and bottom-up. It is a command and control philosophy that empowers the individual warfighter to make decisions.[18] This decentralized structure is the one that fosters self-synchronization and an increased speed of command.

However, decentralized control does not necessarily imply a lack of participation by higher-level commanders. In fact, a proper battlespace awareness system can provide a operational commander with the ultimate in feedback. With proper feedback, decentralized control is not about uncontrolled warfare, but about "orchestrated" warfare with decisions initiated at the lowest appropriate level, and monitoring and corrections performed at higher levels.

Technology has allowed Army General Tommy Franks to keep his headquarters at the Central Command building in Tampa during the Terror War in Afghanistan. Franks explained his decision to command at a distance has been "very effective in our view because

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[16] Joint Chiefs of Staff, Doctrine for Joint Operations, Joint Pub 3-0 (Washington, DC: 2001), A-1.
[17] James FitzSimons, "The Cultural Challenge of Information Technology," Naval War College Review, (Summer 1998), 16.

of technology assists, which provide 24/7 situational awareness" and that communication improvements "have permitted us to provide intent and guidance without doing the tactical work of subordinate commanders."[19] This statement emphasizes a war that is going according to plan. But when operational commanders find their forces diverging from the plan and needing guidance to correct differences from the planned Courses of Action (COAs) there needs to be a method for corrections. This correcting guidance can be provided two ways within a realistic self-synchronization culture: a change to Commander's Intent, or a direct order. Self-synchronization is at its best when guided by changes to the Commander's Intent. Realistically, direct orders will still be needed in some specific cases, but the military commanders should strive for achieving self-synchronization through Commander's Intent when possible.

What about tipping the C2 structure on its head? Do we need an operational commander at all if we achieve self-synchronization? "Why do we have a decision chain in the first place? Ostensibly it's because those up in the organization chart have a wider view as well as more experience…but if everyone has access to information, those on top no longer necessarily have the widest view."[20]

This bottom-up organization required for self-synchronization is a big change for the military. Some NCW advocates predict that "[t]he top-down chain of command…will flatten. We will begin to see a loss of that deference to authority that is inherent in rank structure."[21] These advocates imply that the operational level of war is not longer useful.

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[18] John Zimmerman, "Command and Control in a Network Centric Environment," (JMO Research Paper, U.S. Naval War College, 2001), 2-3.
[19] Thomas Ricks, "A War That's Commanded At a Distance", Washington Post, p. 16 Dec 27, 2001.
[20] Shelia Scarborough, "Network-Centric Warfare Meets the Laws of the Navy," U.S. Naval Institute Proceedings, 32. Quote from Rick Levine, Christopher Locke, Doc Searls, and David Weinberger, The Cluetrain Manifesto.
[21] Sheila Scarborough, 31.

That speed of command would be improved if the tactical and strategic levels of war could be united. But this is a mistake. The advantage of maintaining three levels of war (strategic, operational, and tactical) is to allow proper focus on objectives and to prevent information overload. Alberts, Garstka, and Stein had it right that "to reach its full potential, Network Centric Warfare must be deeply rooted in operational art."[22] But, there will have to be some changes.

This new bottom-up command and control philosophy requires an involved and informed chain of command up to and including the operational commander under a culture of self-synchronization.

Commander's Intent

The formal planning process already includes a formal Commander's Intent to be promulgated from the operational commander to tactical commanders. The Commander's Intent provides broad guidance to tactical commanders. However, as one JMO paper astutely observed: "The Commander's Intent that guided formal planning is not explicit enough to address the uncertainty of actions or events not previously taken into account by the formal planning process."[23] Commander's Intent needs to be re-designed to allow subordinate commander's sufficient flexibility and freedom to act in accomplishing their assigned mission even in the "fog of war."[24]

Using the components of purpose, method, and endstate, the formal Commander's Intent provides an overarching vision for the operation with elements of "how" to accomplish

[22] David Alberts, John Garstka, and Frederick Stein, 3.
[23] Michael Geron, "Commander's Intent: The Critical Transformation," (NWC 1014, U.S. Naval War College), 6.
[24] U.S. Naval War College, "Commander's Estimate of the Situation," (NWC4111D), 1-3.

the mission.[25] This statement is meant to be long-term and therefore is crafted without specific details. However, sometimes details are important for the coordination of different elements in battle. Lacking a formal process for changing the formal Commander's Intent limits its use to provide real-time guidance for self-synchronization. This formal Commander's Intent is a detailed commander's philosophy statement and not an instrument for precise "orchestration". It is important, but alone it is not enough to assure that an operational commander can maximize Clausewitz's "economy of force" principle and "utilizes all forces available to him."[26]

Additionally, the formal Commander's Intent is loosely organized to prevent "plug and chug" mentality. However, without more organization and structure, some Commander's Intents may lack key information needed for self-synchronization. This loose organization also makes the intent tougher to decipher and can lead to inconsistency and delays. What characteristics should an improved Commander's Intent have in order to better support a goal of self-synchronization?

An improved Commander's Intent should be more rigidly structured and must include short-term "how"s for the specific coordination that would be required for self-synchronization. This new Commander's Intent should be integrated into battlespace awareness "chessboard" to guide warfighter's decisions. These changes to Commander's Intent would improve the environment to allow self-synchronization to develop and boost both tactical and operational tempo and preserve the offensive spirit.

Related to Commander's Intent are Rules of Engagement (ROE). Both give guidance to lower level commanders. However, unlike Commander's Intent, which is broad and

[25] Ibid.
[26] Bernard Brodie, "The Worth Principles of War," NWC 1057, 6.

overarching, Rules of Engagement (ROE) already provide detailed guidance on the battlefield — specifically, who to kill and who not to kill. Unfortunately, ROE is currently difficult and slow to change, which is a disadvantage for self-synchronization.

ROE are more structured than Commander's Intent but are developed by a separate group of staff members. Closer mating of these two forms of guidance would be required to provide tactical commanders and shooters with the ability to self-synchronize. To transform to self-synchronization, Commander's Intent and ROE should be developed and updated side-by-side and integrated into battlespace awareness displays.[27] Tactical commanders must not only know major long-term objectives and endstate, but must have some direct real-time guidance for both coordination and execution.

Challenges and counterarguments

Some problems concerning self-synchronization and its umbrella (NCW) have been offered that present challenges to this military transformation. As recent wars have highlighted, fighting as part of coalitions is an important and lasting part of modern warfare — sometimes for political reasons, sometimes for military reasons. As Thomas Barnett has argued against NCW:

> Meanwhile, our relatively rich allies fret about keeping up, wondering aloud about a day when they won't be able even to communicate with us. These states barely can afford the shrinking force structures they now possess, and if network-centric warfare demands that tremendous preconflict investments in data processing that I suspect it does, then the future of coalition warfare looks bleak indeed.[28]

This argument is valid, but focuses on short-term goals. The U.S. military needs to strive for excellence. Upon achieving new levels of military might, then we can help our allies catch

[27] Michael Geron, 16.
[28] Thomas Barnett, "The Seven Deadly Sins of Network-Centric Warfare", Naval Institute Proceedings, (January 1999; Reprint, Newport, RI: U.S. Naval War College, NWC 1079), 2 (page citation to the reprint edition).

up--with the U.S. always at the very top of excellence. By maintaining a cooperative and sharing environment, the U.S. can continue to "set the standard" for military operations. This will "create open markets for defense systems and underlying information technologies." We can approach coalitions always from a position of strength.[29] It is true that incompatibility causes problems in warfare, as any other technology based system, but this should be a minor problem *as long as U.S. forces are jointly connected.*

Another challenge to developing self-synchronization in the military that has been argued is the danger due to inherent lack of control in a bottom-up command and control culture where "orders" are self-generated at the lowest levels. This lack of control would stem from a series of improper decisions at lower levels that lead to uncoordinated actions occurring in uncontrolled manner causing battles to spin out-of-control. A top-down command and control culture is not the best fix for this — the best fix is self-synchronization with real-time monitored feedback and correction.

Just because the "chessboard" will be revealed by NCW, commanders should not wait to "see" the battlefield from their remote position and then provide direct orders only as they are needed. This top-down version of warfare is slow, no matter how fast communications technology becomes because you have to wait for a person to decide. It is better to train warfighters through education and planning to take appropriate action without direct orders following guidance and intent from higher level commanders — the proper culture for self-synchronization. This is how the military should practice and fight.

Summary of Recommendations

1. Create a joint battle awareness expertise rating.

[29] David Gompert, Richard Kugler, and Martin Libicki, Mind the Gap: Promoting a Transatlantic Revolution in Military Affairs, (Washington, DC: National Defense University Press 1999), 16.

2. Update joint and service doctrine to include self-synchronization concepts of command and control.
3. Practice and fight with bottom-up command and control. Decide at lowest level and use improved commander's intent and real-time monitoring to orchestrate forces.
4. Provide feedback loop in self-synchronization to allow proper "orchestration" of bottom-up decision-making.
5. Maintain separate levels of war, proper focus is important to prevent information overload and to properly focus objectives. The levels of war may appear different than they are today, but they should still be distinct.

Conclusion

Self-synchronization promises to bring the ultimate advantage in warfare. To transform, the U.S. military requires fundamental *and realistic* transformations in technology, culture, and doctrine. Of these, culture and doctrine can be changed only from within the military itself. Technology alone is not enough. "There is no guarantee that simply hooking things up across the battlespace without appropriate organizational and doctrinal changes will increase warfighting effectiveness."[30]

By creating professional battlespace awareness experts, the U.S. military could develop a joint, common, and real-time battlespace awareness system. A system designed for self-synchronization should focus to eliminate confusing composite display screens that can make a commander grieve: "I have never been able to read one of these things."

It is important to secure solid feedback with the self-synchronizing command concept. The intention is not to direct, but to monitor and orchestrate. War will cause unforeseen outcomes--this is its nature. Even by giving tactical commanders information

that will allow them to make self-synchronizing battlefield decisions, there will be times when a correction is needed. There will still be differences in decisions between tactical and operational levels of war based not on battlespace awareness, but simply on a different point of view. The goal is to set up the leadership and culture to force operational commanders to orchestrate, and only give direct orders as necessary.

NCW and the promises it holds for improving warfare are technology driven, but technology is only part of the transformation. The U.S. military must take a hard look at how to implement technology for its benefit. Business experience and examples are useful but only to a point. Indeed, "military organization is in many ways too different in mission and purpose to allow direct comparisons with the business world."[31] The U.S. military must keep a long-term view to guide technology in a proper military direction or risk simply accepting "over-the-counter" solutions that are mostly business driven and may not be a military improvement.

Self-synchronization is not about taking people out of the loop. It's about creating parallel processing of minds and significantly boosting speed of command. The military must find its own solutions to apply technology to warfare. There is an element about NCW that gives it an inhuman quality where a computer starts to automatically kill in cold blood without human intervention. This is not where the military should go. Elements of automatic computer decisions will be part of the system, but the human factor is just as important--in fact with self-synchronization, there should be more human thinkers in the loop than ever before. Professor Bernard Brodie's warning to military leaders about the classical principles of war still rings true today concerning the new NCW principles of war: "The

[30] David Alberts, John Garstka, and Frederick Stein, 133.
[31] Sheila Scarborough, 31.

slogan is objectionable for the same reason that an undue deference to the principles of war is objectionable. It acts as a substitute for thinking, and any substitute for thinking is likely to be a bad substitute."[32]

[32] Bernard Brodie, 11. Professor Brodie refers to the danger of blindly obeying classical principles of war that he believes had become slogans in U.S. military culture.

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